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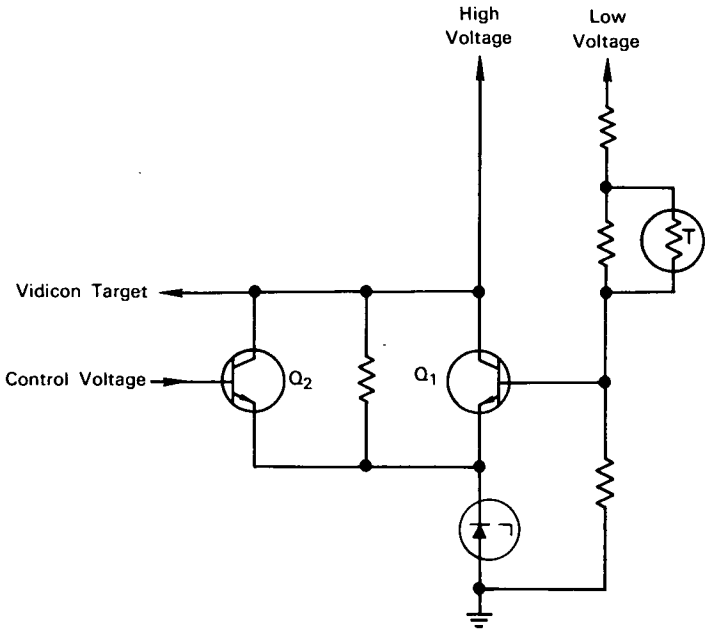
Brief 64-10226

NASA TECH BRIEF

Temperature-Compensation Circuit Stabilizes Performance of Vidicons



The problem: Stabilizing the performance of vidicons (television camera tubes) subjected to temperatures outside their normal operating range. The useful signal current from a vidicon, and hence the quality of the picture from the camera, decreases rapidly when the temperature of the vidicon target varies from $25^\circ \pm 10^\circ$ C.

The solution: A simple transistor circuit employing a thermistor to change the vidicon target potential in relation to temperature.

How it's done: The thermistor used in the temperature-compensation circuit is placed in close proximity to the vidicon target so that both components will be exposed to the same thermal environment. The thermistor material is an intrinsic semiconductor which changes resistance under varying temperature in a manner similar to that of the intrinsic semiconductor material on the target. The voltage at the base of transistor Q_1 will therefore change in correspondence to the change in resistance of the thermistor, and the target potential will change to maintain the useful signal current from the vidicon at the proper operating value.

An additional transistor, Q_2, is used to ensure that the target potential never drops below the minimum value required for satisfactory vidicon operation. This transistor disables the thermistor control and provides a steady zener-controlled potential in its place. This mode would come into operation with high illumination and at high temperatures.

(continued overleaf)

Notes:

1. Tests of the control circuit with an experimental vidicon camera demonstrated that excellent pictures can be obtained over a temperature range of -25° to $+35^{\circ}$ C, with improved picture quality at the lower temperatures.
2. Further information concerning this innovation is described in a paper entitled, *Automatic Data Compression for Television Pictures,* by L. R. Malling, in JPL Space Programs Summary No. 37-18, Vol. IV. Inquiries may also be directed to:
   Technology Utilization Officer
   Jet Propulsion Laboratory
   4800 Oak Grove Drive
   Pasadena, California, 91103
   Reference: B64-10226

Patent status: NASA encourages the immediate commercial use of this invention. Inquiries about obtaining rights for its commercial use may be made to NASA Headquarters, Washington, D.C., 20546.

Source: Jet Propulsion Laboratory
(JPL-486)